

IN THE CLAIMS:

Please cancel claims 9-10 and 19 without prejudice.

Please amend claims 1-8, and 11-18, and 20-61 as follows:

1. (Currently amended) A thermally enhanced fluid composition, comprising:  
an effective amount of a selected neat fluid having a selected thermal conductivity;  
an effective amount of from 0.001 to 10 percent by weight of a selected carbon nanomaterial having an aspect ratio of from 500 to 5000 dispersed into said selected neat fluid, said selected carbon nanomaterial having a thermal conductivity greater than the thermal conductivity of said selected neat fluid in which the carbon nanomaterial is dispersed; and  
an effective amount of at least one chemical dispersing agent having a low hydrophile-lipophile balance (HLB) value of 8 or less.
2. (Currently amended) The thermally enhanced composition of Claim 1 wherein said carbon ~~nanotube~~ nanomaterial is either single-walled, or multi-walled, with ~~typical~~ an aspect ratio of 500-5000.
3. (Currently) The thermally enhanced composition of Claim 1 wherein said carbon nanotube is surface treated to be hydrophilic at surface for ease of dispersing into the aqueous medium.
4. (Currently amended) The thermally enhanced composition of Claim 1 wherein the said ~~dispersant~~ dispersing agent is soluble in the said ~~liquid medium~~ neat fluid.
5. (Currently amended) The thermally enhanced composition of Claim 1 wherein said ~~liquid medium~~ neat fluid is selected from the group consisting of a petroleum distillate and a synthetic petroleum oil.

6. (Currently amended) The thermally enhanced composition of claim 1, wherein said chemical dispersing agent is a surfactant

7. (Currently amended) The thermally enhanced composition of claim 6, wherein said surfactant is selected from the group consisting of a ionic surfactant and a mixture of a nonionic and ionic surfactant.

8. (Currently amended) The thermally enhanced composition of claim 1, wherein said dispersing agent is a dispersant-detergent (DI) additive package.

9. (Cancel) The composition of Claim 1 wherein said ~~liquid-medium~~ is a water based solution.

10. (Cancel) The thermally enhanced composition of claim 9, wherein said dispersant is a nonylphenoxy(ethyleneoxy)ethanol-type surfactant.

11 ~~[[12]]~~. (Once amended) The thermally enhanced composition of claim 1 wherein said neat fluid is a uniform dispersion in a form as a gel or paste.

12 ~~[[14]]~~. (Once amended) The thermally enhanced composition of claim 1, wherein said neat fluid is a grease.

13 ~~[[15]]~~. (Once amended) The composition of claim 1, wherein said carbon nanomaterial comprises carbon nanotubes and graphite nanoparticles.

14 ~~[[16]]~~. (Once amended) The thermally enhanced composition of claim 1, wherein said carbon nanomaterial is selected from the group consisting of carbon nanotubes, graphite nanoparticles, and combinations thereof.

15 [[17]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of a selected carbon nanomaterial to obtain the desired thermal enhancement is up to 20 percent by weight.

16 [[18]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of a selected carbon nanomaterial to obtain the desired thermal enhancement is from 0.001 to 10 percent by weight.

17 [[19]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of a selected carbon nanomaterial to obtain the desired thermal enhancement is from 0.01 to 5 percent by weight.

18 [[20]]. (Once amended) The thermally enhanced fluid composition of claim 1, including a selected amount of oil.

19 [[21]]. (cancel) The thermally enhanced fluid composition of claim 1, including a selected amount of water.

20 [[22]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said effective amount of a selected carbon nanomaterial is up to 90 percent by weight.

21 [[23]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said effective amount of a selected carbon nanomaterial is up to 10 percent by weight.

22 [[24]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said effective amount of a selected carbon nanomaterial is from 0.001 to 2.0 percent by weight.

23 [[25]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said selected carbon nanomaterial has a thermal conductivity exceeding 80W/m-K.

24 [[26]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said selected carbon nanomaterial has a thermal conductivity exceeding that of said selected neat fluid.

25 [[27]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid comprises a petroleum liquid medium selected from the group consisting of a petroleum distillate, a synthetic petroleum oil, a grease, a gel, a oil-soluble polymer composition, and combinations thereof.

26 [[28]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group ~~comprising~~ consisting of Group I (solvent refined mineral oils), Group II (hydrocracked mineral oils), Group III (severely hydrocracked hydrogenated oils), Group IV (polyalphaolefins), [[and]] Group VI (esters, naphthenes, and polyalkylglycols), and combinations thereof.

27 [[29]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group of synthetic hydrocarbon oils, halo-substituted hydrocarbon oils, polymerized and interpolymerized olefins, polybutylenes, polypropylenes, propylene-isobutylene copolymers, chlorinated polybutylenes, poly(1-octenes), poly(1-decenes), alkylbenzenes, dodecylbenzenes, tetradecylbenzenes, dinonylbenzenes, di-(2-ethylhexyl)benzenes, polyphenyls, biphenyls, terphenyls, alkylated polyphenyls, alkylated diphenyl, ethers [[and]] alkylated diphenyl sulfides, and combinations thereof.

28 [[30]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group ~~comprising~~ consisting of the esters of dicarboxylic acids selected from the group consisting of phthalic acid, succinic acid, alkyl succinic acids and alkenyl succinic acids, maleic acid, azelaic acid, suberic acid, sebacic acid, fumaric acid, adipic acid, alkenyl malonic acids, with an alcohols selected from the group consisting of butyl alcohol, hexyl alcohol, dodecyl alcohol, 2-ethylhexyl alcohol, ethylene glycol diethylene glycol monoether, propylene

glycol, dibutyl adipate, di(2-ethylhexyl) sebacate, di-hexyl fumarate, dioctyl sebacate, diisooctyl azelate, diisodecyl azelate, dioctyl phthalate, didecyl phthalate, dicicosyl sebacate, the 2-ethylhexyl diester of linoleic acid dimer, the complex ester formed by reacting one mole of sebacic acid with two moles of tetraethylene glycol and two moles of 2-ethylhexanoic acid, and combinations thereof.

29 [[31]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group ~~comprising~~ consisting of esters made from C<sub>5</sub> to C<sub>12</sub> monocarboxylic acids and polyols and polyol ethers such as neopentyl glycol, trimethylolpropane, pentaerythritol, dipentaerythritol, tripentaerythritol, and combinations thereof.

30 [[32]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from a polyalphaolefins having a viscosity of up to 100 centistoke at 100°C.

31 [[33]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group of synthetic based oil ester additives consisting of polyolesters, diesters, di-aliphatic diesters of alkyl carboxylic acids, di-2-ethylhexylazelate, di-isodecyladipate, di-tridecyladipate, and combinations thereof.

32 [[34]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the group of diesters consisting of an aliphatic diester of a dicarboxylic acid, a dialkyl aliphatic diester of an alkyl dicarboxylic acid, a di-2-ethyl hexyl azelate, a di-isodecyl azelate, a di-tridecyl azelate, a di-isodecyl adipate, a di-tridecyl adipate, and combinations thereof.

33 [[35]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from a hydrogenated oil having a sulfur level less than 0.03 with saturates greater than or equal to 90 and a viscosity index of greater than or equal to 120.

34 [[36]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is a hydrogenated oil having a viscosity of from 2 to 60 CST at 100 degrees centigrade.

35 [[37]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is a hydrogenated oil present in an amount of up to 99 percent by volume.

36 [[38]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the water-based group consisting of an alcohol and its derivatives.

37 [[39]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said neat fluid is selected from the water-based group consisting of an ethylene glycol, a propylene glycol, a methyl alcohol, an ethyl alcohol, a propyl alcohol, an isopropyl alcohol, and combinations thereof.

38 [[40]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said dispersants are selected from the group consisting of an lipophilic hydrocarbon group, and a polar functional hydrophilic group.

39 [[41]]. (Once amended) The thermally enhanced fluid composition of claim 38 [[1]], wherein said polar functional hydrophilic group is selected from the class of carboxylate, ester, amine, amide, imine, imide, hydroxyl, ether, epoxide, phosphorus, ester carboxyl, anhydride, or nitrile.

40 [[42]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said dispersant is an ashless dispersant typically used in the petroleum industry selected from the group consisting of N-substituted polyisobutenyl succinimides and succinates, alkyl methacrylate-vinyl pyrrolidinone copolymers, alkyl methacrylate-dialkylaminoethyl methacrylate copolymers, alkylmethacrylate-polyethylene glycol methacrylate copolymers, and polystearamides.

41 [[43]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said dispersant is an oil-based dispersants selected from the group consisting of alkylsuccinimide, succinate esters, high molecular weight amines, Mannich base derivatives, phosphoric acid derivatives, polyisobutenyl succinimide-polyethylenepolyamine, polyisobutenyl succinic ester, polyisobutenyl hydroxybenzyl-polyethylenepolyamine, and bis-hydroxypropyl phosphorate.

42 [[44]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of said dispersant present in an amount of from 0.001 to 30 percent by weight.

43 [[45]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of said dispersant present in an amount of from between 0.5 percent to 20 percent weight.

44 [[46]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of said dispersant present in an amount of from between 2 to 6 weight percent by weight.

45 [[47]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein an effective amount of said nanomaterial present is in an amount of 0.0001 up to 50 percent by weight.

46 [[48]]. (Once amended) The thermally enhanced fluid composition of claim 1, wherein said dispersant is selected from the group consisting of a high molecular weight polyamine dispersion inhibitor package, a high molecular weight succinimide dispersion inhibitor package, a mixed dispersant comprising a high molecular weight succinimide and an ester, a bis-succinimide, a nonylphenoxy poly(ethyleneoxy), OLOA 9061 dispersant, LUBRIZOL 4999 dispersant, LUBRIZOL 9802A dispersant, LUBRIZOL 9802AC dispersant, INFINEUM C9231 dispersant, INFINEUM C9232 dispersant, INFINEUM C9235 dispersant, LUBRIZOL QS154250 dispersant.

47 [[49]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of a viscosity improver selected from the group consisting of an olefin copolymers (OCP), a polymethacrylates (PMA), a hydrogenated styrene-diene (STD), a styrene-polyester (STPE) polymers, and an olefin copolymer.

48 [[50]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of at least one pour point depressant selected from the group consisting of an alkyl naphthalene, an acrylic copolymer, a polymethacrylate, a polyfumarates, a styrene ester, an oligomerized alkylphenol, a phthalic acid ester, an ethylene vinyl acetate copolymer, and other mixed hydrocarbon polymers.

49 [[51]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of a rust and oxidation inhibitor.

50 [[52]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of a demulsifier.

51 [[53]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of a foam inhibitor.

52 [[54]]. (Once amended) The thermally enhanced fluid composition of claim 1, including an effective amount of a seal swelling agent.

53 [[55]]. (Once amended) A method of thermally enhancing the conductivity of a fluid composition, comprising the steps of:  
selecting a neat fluid having a selected thermal conductivity;  
selecting a carbon nanomaterial having an aspect ratio of from 500 to 5000 in an effective amount of from 0.001 to 10 percent by weight;  
dispersing said selected carbon nanomaterial having a thermal conductivity greater than the



thermal conductivity of said selected neat fluid in which the carbon nanomaterial is dispersed into said neat fluid; and

adding at least one chemical dispersing agent having a low hydrophile-lipophile balance (HLB) value of 8 or less thereto forming a thermally enhanced fluid.

54 [[56]]. (Once amended) The method of ~~thermally enhancing the conductivity of a thermally fluid composition of claim [[55]]~~ 53, including the step of ~~pre~~ shearing said ~~dispersed nanomaterial solution~~. thermally enhanced fluid containing dispersed nanomaterial.

55 [[57]]. (Once amended) The method of ~~thermally enhancing the conductivity of a fluid composition of claim [[56]]~~ 54, wherein said ~~step of pre-~~ shearing step is selected from the group of processing methods consisting of creating a turbulent flow through a nozzle, creating a turbulent flow thorough a high pressure fuel injector, an ultrasonic device, and combinations thereof to achieve a stable viscosity.

56 [[58]]. (Once amended) A method of thermally enhancing the conductivity of a fluid composition, comprising  
the steps of:  
selecting a neat fluid having a selected thermal conductivity;  
selecting a carbon nanomaterial having an aspect ratio of from 500 to 5000 in an effective amount of from 0.001 to 10 percent by weight;  
selecting at least one chemical dispersing agent having a low hydrophile-lipophile balance (HLB) value of 8 or less;  
dissolving said at least one chemical dispersing agent ~~dispersant~~ into said neat fluid forming a liquid medium dispersing fluid;  
adding said carbon ~~nanoparticle~~ nanomaterial into said liquid medium dispersing fluid while being agitated or ultrasonicated. forming a thermally enhanced fluid composition.

57 [[59]]. (Once amended) The method of thermally enhancing the conductivity of

a fluid composition of claim 56 [[58]], including the step of ~~pre-shearing said dispersed nanomaterial solution.~~ of further shearing said thermally enhanced fluid composition containing nanomaterial.

58 [[60]]. (Once amended) The method of ~~thermally enhancing the conductivity of a fluid composition~~ of claim 57 [[59]], wherein said shearing step of ~~pre-shearing~~ is selected from the group of processing methods consisting of creating a turbulent flow through a nozzle, creating a turbulent flow thorough a high pressure fuel injector, an ultrasonic device, and combinations thereof to achieve a stable viscosity.

59 [[61]]. (Once amended) A method of thermally enhancing the conductivity of a fluid composition, comprising the steps of:

- selecting a neat fluid having a selected thermal conductivity;
- selecting a carbon nanomaterial having an aspect ratio of from 500 to 5000 in an effective amount of from 0.001 to 10 percent by weight;
- selecting at least one chemical dispersing agent having a low hydrophile-lipophile balance (HLB) value of 8 or less;
- dissolving said carbon nanomaterial into said neat fluid forming a liquid medium;
- adding said chemical dispersing agent into said liquid medium simultaneously while being agitated or ultrasonicated.

60 [[62]]. (Once amended) The method of thermally enhancing the conductivity of a fluid composition of claim 59 [[61]], including the step of ~~pre-shearing said dispersed nanomaterial solution.~~ of further shearing said thermally enhanced fluid composition containing nanomaterial.

61 [[63]]. (Once amended) The method of ~~thermally enhancing the conductivity of a fluid composition~~ of claim 60 [[62]], wherein said shearing step of ~~pre-shearing~~ is selected from the group consisting of creating a turbulent flow through a nozzle, creating a turbulent flow thorough a high pressure fuel injector, an ultrasonic device, and combinations thereof to achieve a stable viscosity.